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EFFECT OF A PLASTIC MULCH ON WEED GROWTH AND EARLY HEIGHT GROWTH OF HONDURAS PINE

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Summary

Black polyethylene squares, 90 x 90 cm, were used in two tests to reduce competition of weeds around newly planted trees. One test was on a wet site at 1800 feet elevation, the other on a moist site near sea level.

Species of forbs and grass differed between sites, but at both locations weeds overran the mulch in a short time. Positioning the mulch was time consuming and care was necessary in subsequent cleanings to avoid moving it.

Some improvement in vigor was obtained by mulching, but the amount of improvement was not of practical importance in the first year.

Resumen

En una plantación mixta de Hibiscus elatus Sw. y Anthocephalus cadamba (Roxb.) Miq. establecida hacía unos 6 meses realizamos una prueba preliminar acerca del uso de tela plástica en combinación con yerbicidas para controlar las malezas. Esta plantación está localizada a unos 545 metros de elevación y recibe una lluvia anual de más de 2540 mms. La competencia de gramíneas y bejucos era intensa.

Una segunda prueba se realizó en una plantación de

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pino de Honduras recién plantados y cuya altura promedio era de 25 cms. La localidad está aproximadamente a 15 metros sobre el nivel del mar y la lluvia anual es aproximadamente de 1778 mms. La competencia de yerbajos era menos intensa debido entre otras cosas a que el área había estado por varios años bajo una densa cubierta de arbustos que había eliminado por completo el crecimiento de los yerbajos. En este caso quisimos investigar especialmente el supuesto efecto estimulante sobre los árboles al cubrir la base alrededor con tela plástica. En el caso del pino no se realizó investigación en el uso de yerbicidas.

El uso de la tela plástica no redujo en modo apreciable la necesidad de desyerbos. Debido al área relativamente pequeña ocupada por la tela plástica los yerbajos crecieron sobre la tela y al realizar las limpias con machete y azada fué necesario trabajar con más cuidado para no molestar el cuadro de tela plástica.

Se obtuvo una mejoría en el crecimiento al usar la tela plástica pero el monto del crecimiento no fué de importancia práctica durante el primer año, que es el período de mayor necesidad.

Reforestation in the humid tropics often requires planting tree seedlings in areas heavily invaded by weeds. The land is often too steep for mechanical site preparation previous to planting, and the competition from weeds, vines, and grasses is severe.

The species of weeds vary considerably, but in similar climates the successional progression is fairly consistent. Where tall brush or forest has been recently cleared, herbaceous plants, woody shrubs, and a variety of vines take over. Ipomoea tiliacea (Willd.) Choisy is the most common vine in humid and wet regions. If shade is quickly reestablished, especially on humid sites, succulent herbs like Commelina dominate for some time.

If herbicides are used, the bushes and vines disappear and are soon replaced by the grasses. If an area is repeatedly cultivated and/or grazed the grasses clearly dominate, both the running type like Chloris and the bunch type like Andropogon.

The control of such weeds by manual operations alone is very costly. In practice a clean area 2 to 3 feet in diameter is maintained around the individual seedling or in a continuous strip along the row of trees. Herbs and woody shrubs are

cleaned with machetes, but if grasses predominate a hoe is necessary to uproot the sod. After this, additional weeding can be done with a machete unless grasses continue sending runners into the weeded area. Since hoeing removes considerable top soil with the grass roots, the area around the tree becomes an exposed, hardened surface, an undesirable condition.

Thus if weed growth in the critical area around the seedling could be controlled by a mulch, the vegetation between the rows might be kept in check more cheaply with a combination of chopping and herbicides or, under favorable circumstances, with herbicides alone.

Preliminary test

The first test was in an area which had been in cultivation for several years, then abandoned, and was overrun with a combination of forbs and grasses. Elevation is about 1800 feet. The soil is a wet plastic clay (annual rainfall exceeds 100 inches), is poorly drained and is wet most of the year. Previous to planting, all the vegetation was cut with machetes and burned as completely as was possible in this humid area. The area was then sprayed with herbicides thought to be effective against grasses.

A mixture of blue mahoe (Hibiscus elatus Sw.) and cadam (Anthocephalus cadamba (Roxb.) Miq.) was planted, but the previous treatment had not reduced the weed growth adequately. A combination of manual weeding and contact herbicide (pentachlorophenol in water) was used to clean the plantation.

About six months after planting two plots of 16 seedlings each were established for each of the following treatments:

1. Pentachlorophenol solution and T.C.A. (Sodium trichloroacetate), 1/4 lb. per 4 gallons of water.

2. T.C.A. alone, 1/4 lb. per 4 gallons of water.

3. Polyethylene squares, 90 x 90 cm centered around each seedling, plus T.C.A. applied to the remaining area.

The predominant weeds were horquetilla (Chloris sp.), bejuco de puerco (Ipomoea tiliaceae (Willd.) Choisy), and cohitre (Commelina diffusa Burm f.).

Three months after the initial application the herbicide treatments were repeated, except that the amount of T.C.A. was increased to 1/2 lb. per 4 gallons of water. Four months after the first application and one month after the second the results were evaluated:

1. None of the herbicides apparently affected the tree seedlings adversely.

2. Herbicides helped to keep aggressive species like Ipomoea and Commelina in check (practically impossible by using hand weeding only), but some weeds recovered within eight weeks, especially the grasses, and still required hand weeding. When the vines were held back grasses often rapidly filled the gap.

3. Weeds developed vigorously around the seedlings, so later removal by hand was necessary.

4. Fixing the plastic squares in place to keep them from blowing took considerable effort in this wet plastic clay devoid of stones or loose soil.

5. Runners of the three weeds mentioned above swarmed over the plastic squares so eventually the mulched area had to be cleaned also.

6. Although measurements were not taken, the mulched mahoe seedlings appeared to show better color and more vigor than the adjacent unmulched seedlings.

Second test

The second test area was at an elevation of approximately 50 feet, where average annual rainfall is 70 inches. A thick growth of bushes had practically eliminated weeds and grass. A low growth of a cultivated grass (wild rice) was growing at the time, and native weeds invaded, but weed growth was much less than during the first trial.

Two blocks of 60 pines (Pinus caribaea Morelet v. hondurensis) averaging 25 cm tall were treated. Each block consisted of 30 pairs of seedlings, one mulched with black polyethylene plastic in 90cm x 90cm squares, and one unmulched. Thus there were 30 mulched and 30 unmulched trees per block. No herbicides were used. Use of the mulch did not make much difference in the amount of weeding necessary since the weeds grew over the mulch, and the hoe and machete weeding had to be done more carefully so as not to disturb the plastic square. Survival was slightly in favor of the unmulched seedlings.

Height growth was as follows:

Table 1.--Height growth, March-October, 1963.
Crecimiento en altura, marzo-octubre, 1963.

Block	Height in		Survival	
	Mulched	Not mulched	Mulched	Not mulched
	centimeters		percentage	
1	48.5	38.1	90	100
2	43.6	35.7	97	90
Average	46.0	36.9	93.5	95

The difference in height growth during the first 7 months was 0.3 feet, or approximately 4 inches. There was no apparent difference in thriftiness.